

WHAT IS CLAIMED IS:

1. A transmitter for use in a tire state monitoring apparatus, wherein the transmitter transmits data indicating the state of a vehicle tire mounted on a wheel having an outer circumferential surface, the transmitter comprising:

a valve stem having an axial direction and connectable to the wheel to which the tire mounts;

a circuit board on which a plurality of electric components are mounted to detect the state of the tire;

a casing for accommodating the circuit board in the tire, wherein the casing is positionable facing the outer circumferential surface of the wheel;

a connecting portion for connecting the casing to the valve stem pivotally about a line perpendicular to the axial direction of the valve stem; and

a pressing mechanism for pressing the casing toward the outer circumferential surface of the wheel to restrict pivoting of the casing.

2. The transmitter according to claim 1, wherein the casing includes an end portion, and the connecting portion includes:

a seat having a middle portion, the seat being formed on the end portion of the casing to receive the valve stem;

a pivot hole extending through the middle portion of the seat to enable pivoting of the casing; and

a slide surface formed on the valve stem and movably received by the seat.

3. The transmitter according to claim 1, wherein the valve stem includes a projection inserted through the pivot hole, the pressing mechanism being arranged in the

projection to press the casing and restrict pivoting of the casing toward the valve stem.

4. The transmitter according to claim 3, wherein the
5 projection includes a through hole, and the pressing mechanism includes a distal portion inserted through the through hole to contact the casing.

5. The transmitter according to claim 4, wherein the
10 pressing mechanism extends out of the valve stem over a length that is adjustable.

6. The transmitter according to claim 5, wherein the
15 through hole and the pressing mechanism are threaded to mate the pressing mechanism and the through hole with each other.

7. The transmitter according to claim 6, wherein the
20 pressing mechanism comprises a bolt for fastening the casing to the outer circumferential surface of the wheel.

8. The transmitter according to claim 3, wherein the
25 projection includes a diameter and the pivot hole is an elongated hole having a width that is substantially the same as the diameter of the projection.

9. The transmitter according to claim 1, wherein the casing has a sloped surface contacted by the pressing mechanism.

30 10. The transmitter according to claim 9, wherein the sloped surface is inclined relative to the outer circumferential surface of the wheel when the casing is pressed toward the outer circumferential surface of the

wheel.

11. The transmitter according to claim 9, wherein the sloped surface is covered by metal.

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12. The transmitter according to claim 1, wherein the valve stem includes an end face, and the connecting portion includes:

10 two parallel first connecting members arranged on the end face of the valve stem, each of the first connecting members having a first through hole;

two parallel second connecting members arranged on the casing, each of the second connecting members having a second through hole; and

15 a pivot shaft inserted through the first and second through holes to pivotally support the casing.

13. The transmitter according to claim 12, wherein the pressing mechanism includes a resiliently deformable member arranged on the pivot shaft to urge the casing toward the outer circumferential surface of the wheel.

14. The transmitter according to claim 13, wherein the resiliently deformable member is fitted to the pivot shaft and has a first end for contacting the casing and a second end for contacting the end face of the valve stem.

15. The transmitter according to claim 14, wherein the pivot shaft has a first end portion and a second end portion that are rivet-like to restrict movement of the casing in the axial direction of the pivot shaft.

16. A transmitter for use in a tire state monitoring

apparatus, wherein the transmitter transmits data indicating the state of a vehicle tire mounted on a wheel having an outer circumferential surface, the transmitter comprising:

5 a valve stem, having an axial direction, connectable to the wheel to which the tire mounts and having an end portion through which a fastener hole extends;

a circuit board on which a plurality of electric components are mounted to detect the state of the tire;

10 a casing for accommodating the circuit board in the tire, wherein the casing is positionable facing toward the outer circumferential surface of the wheel;

a connecting portion for connecting the casing to the valve stem pivotally about a line perpendicular to the axial direction of the valve stem; and

15 a fastener for fastening the casing to the outer circumferential surface of the wheel to restrict pivoting of the casing, wherein the fastener is inserted through the fastener hole and has a distal portion that contacts the casing.

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17. The transmitter according to claim 16, wherein the casing includes an end portion and the connecting portion includes:

25 a seat having a middle portion, the seat being formed on the end portion of the casing to receive the valve stem;

a pivot hole extending through the middle portion of the seat to enable pivoting of the casing; and

a slide surface formed on the valve stem and movably received by the seat.

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18. The transmitter according to claim 17, wherein the fastener comprises a bolt.

19. A transmitter for use in a tire state monitoring apparatus, wherein the transmitter transmits data indicating the state of a vehicle tire mounted on a wheel having an outer circumferential surface, the transmitter comprising:

5 a valve stem connectable to the wheel to which the tire mounts, the valve stem including an end face and an axial direction;

 a circuit board on which a plurality of electric components are mounted to detect the state of the tire;

10 a casing for accommodating the circuit board in the tire;

 a connecting portion for connecting the casing to the valve stem pivotally about a line perpendicular to the axial direction of the valve stem; and

15 an urging arrangement for urging the casing toward the outer circumferential surface of the wheel to restrict pivoting of the casing, wherein the urging arrangement includes a resiliently deformable member having a first end for contacting the casing and a second end for contacting
20 the end face of the valve stem.

20. The transmitter according to claim 19, wherein the connecting portion includes:

 two parallel first connecting members arranged on the
25 end face of the valve stem, each of the first connecting members having a first through hole;

 two parallel second connecting members arranged on the casing, each of the second connecting members having a second through hole; and

30 a pivot shaft inserted through the first and second through holes to pivotally support the casing, wherein the resiliently deformable member is fitted to the pivot shaft.

21. The transmitter according to claim 20, wherein the resiliently deformable member is a torsion coil spring.